WASTEWATER MASTER PLAN FOR CLERMONT COUNTY, OHIO

Final Report
November 1995

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ACKNOWLEDGEMENTS

This final report is the product of nearly 18 months of study, investigation and analysis of the current and future wastewater management issues facing Clermont County, Ohio. Over the course of the project, comments, concerns, ideas and support have been provided to the Project Team by a large number of individuals representing public and private interests in the county. This input has proven to be an extremely valuable resource during the development of the master plan. It is expected that continued involvement by interested individuals will also be critical to the successful implementation of the plan.

While it is not possible to recognize all those who have participated in the project, the significant contributions made by those listed below merit special acknowledgement.

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HORNER'S RUN/LOVELAND FACILITY PLANNING AREA

The Horner's Run/Loveland Facility Planning Area encompasses more than 13 square miles of area in the northwestern part of Clermont County, including a significant portion of Miami Township as shown in Exhibit 1. The entire planning area is tributary to the Little Miami River which flows from north to south along the planning area's western boundary.

Assessment of Existing Conditions

Population and Development

Existing development within the Horner's Run/Loveland FPA is widely distributed. Relatively high residential densities within the area are centered in the southeastern portion of the City of Loveland, the community of Miamiville and along the major local transportation routes (Branch Hill - Guinea Road, Ward's Corner Road, Loveland - Miamiville Road). Developed properties within the planning area are primarily a mix of old and new single family units constructed at typical suburban densities. Non-residential developments are limited to commercial properties located along Ward's Corner Road near the I-275 Interchange, and small commercial, institutional and recreational properties scattered throughout the area. Based on current zoning, moderate density residential development is expected to continue to be the primary land use pattern.

The current population within the Horner's Run Planning Area is estimated to be 10,750. Given that the recent pattern of rapid growth within the area is expected to continue, future population within the FPA is expected to reach nearly 12,000 by the year 2000. Projections indicate total population values of approximately 12,900 for 2010 and 13,950 for 2020. The projected saturation population for the planning area (based on current zoning) is estimated to be 15,870. Depending on actual growth patterns, build-out conditions are expected to be reached within the Horner's Run/Loveland planning area before the year 2030. The basis for projected populations within the facility planning area is presented in greater detail in the supporting document - **Projections of Population and Wastewater Flows.**

Receiving Streams

The entire Horner's Run/Loveland Facility Planning Area is tributary to the Little Miami River (LMR). The western edge of the planning area drains directly to the Little Miami River, while the central and eastern sections of the FPA drain to the LMR via Horner's Run and two small unnamed streams. Sub-basins drained by these smaller streams are generally less than about 5 square miles in area. Within the planning area, ground elevations along the Little Miami River drop from about 580 feet above sea level near the northern limit of Clermont County to about 530 north of the City of Milford. Streamflows within Horner's Run and the unnamed tributaries to the LMR are not gauged, but mean statistical 7-day, 10 year low flows are estimated to be 0 cfs.

The Ohio EPA has designated the Little Miami River an exceptional warmwater habitat. The Little Miami River is also classified as a State Resource Water and a Scenic River. Of the 12.5

miles of waterway located along the western boundary of Clermont County, OEPA has identified roughly 36 percent as providing threatened support of its water quality designation, 54 percent as providing partial support, and 10 percent as being non-supportive.

The State of Ohio Water Quality Standards classify Horner's Run as a warmwater habitat suitable for primary contact recreation uses. No use designations have been assigned to the other tributaries draining the planning area. The smaller waterways in the planning area are high quality, intermittent streams flowing through steep wooded ravines over layered limestone bedrock bases.

Impacts on the quality of the Little Miami River and its tributaries within the Horner's Run Loveland facility planning area are attributed primarily to municipal point source discharges and failing on-site systems. Identified point source discharges include the effluent discharges from the four small CCSD wastewater treatment plants (Arrowhead Park, Bramblewood, Indian Lookout and Miami Trails) and five significant semi-public treatment facilities. Discharges from stormwater collection systems in developed areas make up another category of point source discharges. Nonpoint source discharges to the LMR and its tributaries include discharges from on-site home sewage disposal systems and uncollected stormwater runoff from roadways, parking lots and lawns in the developed portions of the basin.

Status of Wastewater Management

Wastewater generated within the Horner's Run/Loveland FPA is currently disposed of through a combination of centralized wastewater collection/treatment systems, small semi-public treatment facilities, and individual on-site sewage disposal systems. Wastewater from the portion of the City of Loveland located within Clermont County is collected and conveyed to the Cincinnati MSD Polk Run Wastewater Treatment Plant located along the LMR in eastern Hamilton County. Roughly 16 percent of the current FPA population is estimated to be served by this system. The four small treatment facilities operated by the Clermont County Sewer District serve approximately another 23 percent of the FPA population. The balance of the population in the Horners Run/Loveland planning area is served by semi-public systems (2 percent) and individual on-site systems (59 percent).

Projected Wastewater Quantities

Based on current operating data, it is estimated that a total of 0.72 mgd of base sanitary flow (wastewater not including extraneous flows) was generated daily within the Loveland/Horners Run FPA during 1992. This amount includes approximately 0.15 mgd collected and conveyed to the four CCSD North Plants, 0.12 mgd conveyed from the City of Loveland to the Cincinnati MSD system and 0.45 mgd estimated to be tributary to semi-public and home sewage disposal systems. Based on population projections, the quantity of base sanitary flow generated within the planning area is projected to increase to approximately 1.0 mgd by the year 2020.

Theoretically, current septage production from on-site sewage disposal systems within the planning area should total approximately 1.3 million gallons per year. While actual data for the

Loveland/Horners Run FPA is not readily available, Countywide septage disposal data suggest that only about 60% of the theoretical septage produced, or roughly 800,000 gallons, was collected and hauled for disposal in 1992. Given the likelihood of significant centralized sewer improvements within the Loveland/Horners Run FPA, the volume of septage generated in the future is projected to decrease significantly. The actual decrease will depend directly on decisions made regarding future expansion of centralized facilities within the planning area. Table 3-9 summarizes estimates of wastewater and septage generation developed for the Loveland/Horners Run planning area assuming that centralized service is extended to more than 80% of the FPA population by 2020. The basis for these projections is presented in greater detail in the supporting document- **Projections of Population and Wastewater Flows**.

Centralized Wastewater Collection and Treatment Facilities

Centralized wastewater treatment facilities located within the Loveland/Horners Run Facility Planning Area include the four CCSD North Plants (Arrowhead Park, Bramblewood, Indian Lookout and Miami Trails) and their associated collection systems. In total, the CCSD North Plants are currently rated to provide advanced treatment of approximately 0.43 mgd of flow on an annual average basis. All of the plants utilize extended aeration as their primary treatment process.

Effluent streams from the existing CCSD treatment facilities are discharged to various tributaries of the Little Miami River. More detailed descriptions of the CCSD North Plants facilities are given in the supporting document - **Evaluation of Centralized Wastewater Management Facilities: Wastewater Treatment Facilities**.

Given the high quality of the Little Miami River and its tributaries in the Loveland/Horners Run FPA, the Ohio EPA has established strict discharge criteria for the effluent from the North Plants. Criteria defined in the current NPDES permits require 30 day average effluent concentrations of $CBOD_5$, Suspended Solids and Ammonia to be less than 10 mg/l, 12 mg/l and 2.5 mg/l respectively during summer months at the Bramblewood, Indian Lookout and Miami Trails plants. The current permit for the Arrowhead Park facility allows for slightly higher summer effluent concentrations (15 mg/l $CBOD_5$, 15 mg/l TSS, 16 mg/l Ammonia). Effluent from the plants must also meet criteria for dissolved oxygen, fecal coliform, chlorine residual and pH. A detailed listing of the NPDES effluent criteria for the each of the North Plants is given in the supporting document **Evaluation of Centralized Wastewater Management Facilities: Wastewater Treatment Facilities**.

The existing CCSD North Plants currently serve a total area of approximately 480 acres, 531 accounts and a population of about 2,400 persons. Wastewater collected from throughout the four service areas is conveyed to the respective treatment facilities by roughly 14.5 miles of sewer. Existing trunk sewers within the collection systems are all 8 inches in diameter.

Assessment of Facility Capacity - Existing Service Area. Analyses of the centralized treatment and collection facilities operated by the CCSD within the Loveland/Horners Run FPA indicate that the existing facilities generally have limited potential for providing service to additional areas. Each of the existing systems was originally constructed to serve a specific development, and provisions for significant expansion to serve new areas were not made. In addition, the

Table 3-9

PROJECTED WASTEWATER FLOWS AND LOADS
LOVELAND/HORNERS RUN FACILITY PLANNING AREA

	1992	2000	2010	2020
Projected Population	10596	11835	12905	13947
Extent of Centralized Service (Assumed)	38.6%	47.9%	64.6%	80.7%
Centralized Service Areas				
Residential Service Population	4090	5670	8335	11262
Average Day Base Sanitary Flow (mgd)	0.27	0.42	0.62	0.84
Average Day Sanitary Flow (mgd)	0.39	0.57	0.81	1.08
Wet Weather Peak Flow (mgd)	0.89	1.15	1.41	1.69
Average Organic Loading (lb CBOD5/day)	676	1016	1456	1940
Average Solids Loading (lb TSS/day)	845	1372	2055	2805
Non-Centralized Service Areas				
Residential Service Population	6506	6165	4570	2685
Estimated Septage Production (gpd)	3681	3432	2544	1494

Notes
1. Infiltration in new sewer areas assumed equal to 20% of base flow./m
2. Wet Weather I/I in new sewer areas assumed equal to 5.0 times base sanitary flow
3. Septage production rates based on:
   - septic tanks cleaned once every 2.5 years
   - 1500 gallons septage produced per cleaning
   - estimated base flow per unsewered residential unit = 195 gpd

facilities at the Arrowhead Park and Indian Lookout sites have deteriorated over time and are in need of significant rehabilitation effort simply to maintain their current capacity.

The existing North Plants have been approved by OEPA to serve a total of 1566 single famiy equivalents (SFE). CCSD data indicate that the plants presently serve a total of 1110 SFE connections. The distribution of approved and actual connections is shown below:

	NO. OF SFE CONNECTIONS		
	OEPA Approved	Actual Connections	Connected Percent
Arrowhead Park	350	303	87%
Bramblewood	166	138	85%
Indian Lookout	193	161	83%
Miami Trails	857	508	59%

Treatment plant operating data show that the four plants are currently capable of reliably producing effluent which meets or exceeds the current discharge standards under normal flow conditions. However, input provided by CCSD operations staff suggests that all of the plants, except for Miami Trails, are subject to periods of overloading during periods of wet weather. Provisions for flow equalization at the plants are minimal.

Sludges generated at the north plants are digested on site in aerated digestion and/or storage tanks before being hauled to the O'Bannon Creek site for land application or further processing. Details of the sludge management improvements recommended for the CCSD facilities in the Loveland/Horners Run FPA are discussed in greater detail in Chapter 4 of this report, and in the **Sludge Management Plan** document.

Assessment of System Capacity - Potential Service Areas. As indicated above, the characteristics of the existing CCSD North Plants sites and facilities limit their potential for supporting expansion of the centralized service area within the Loveland/Horners Run FPA. As a result, plans for significant increases in the extent of the centralized service area in the FPA will require consideration of provisions for increased treatment capacity at sites other than the existing North Plant sites.

In summary, critical short-term capital improvements necessary to provide for continued reliable management of wastewater from within the existing sewered areas of the Loveland/Horners Run FPA include:

- rehabilitation of monitoring and treatment facilities at the Arrowhead Park and Indian Lookout treatment plant sites to provide for reliable treatment of projected flows during the next five years.
- expansion of the existing Miami Trails WWTP as required to support continued development within the subdivision tributary to the plant, and

- modification of facilities, at the Bramblewood WWTP site to reduce the impacts of peak wet weather flows on system performance.

Non-Centralized Wastewater Management Facilities

Non-centralized wastewater management facilities, including both semi-public and on-site sewage disposal systems, are estimated to serve approximately 6,500 persons within the Loveland/Horners Run FPA. Based on typical flow rates, it is estimated that nearly 450,000 gallons of wastewater are treated and disposed of by these facilities on a daily basis. Treated effluent from these facilities is discharged either directly to streams tributary to the Little Miami River or to soil adsorption systems.

Data related to treatment systems used by semi-public entities and individual property owners practicing on-site treatment and disposal is limited. As a result, it is not possible within the scope of this project, to precisely define the location and/or type of all non-centralized wastewater management facilities within any facility planning area. Rather efforts have been focused toward the identification of existing and/or likely future problem areas.

A total of four significant, existing semi-public wastewater treatment facilities serving a total of approximately 591 population equivalents have been identified within the Loveland/Horners Run FPA. Key characteristics of each of these facilities are summarized in Table H-3 of the supporting document - **Assessment of the Relationship Between Point and Nonpoint Source Pollution in Surface Streams of the County.**

Based on the best available information, the number of individual on-site systems within the Loveland/Horners Run planning area is estimated to be approximately 2801. The locations of existing developed areas within the Loveland/Horners Run FPA identified by the Clermont County General Health District as being served by failing or problematic home sewage disposal systems are shown in Exhibit 1. A summary of basic information related to these areas is given in Table A of the supporting document - **Assessment of On-site Wastewater Disposal Systems.** It is estimated that these identified problem areas and concentrations currently include a total of about 744 systems serving approximately 1,730 people. Roughly 70% of these systems are aerobic units. The remaining 30% are variations of conventional septic systems relying on soil absorption for final disposal.

The majority of the identified on-site problem areas within the Loveland/Horners Run planning area are subdivision developments made up of relatively small lots ($\pm$ 0.5 acres) located along ridgelines above steep, wooded ravines. Because this type of development is typical of the entire Loveland/Horners Run FPA, the potential already exists for the development and appearance of significantly more home sewage disposal problems areas within the basin. Estimates developed from further review of conditions in the planning area indicate that as many as 1540 additional existing on-site systems are susceptible to the same conditions that resulted in failure of the units in the identified problem areas.

Critical Wastewater Management Issues

Development densities within the Loveland/Horners Run planning area are high, and continued pressure for high density development is likely due to the area's location along the I-275 corridor. The area is already being impacted by wastewater management problems related to the deterioration of centralized facilities and the failure of existing on-site units. Without effort to correct these problems and provide for future growth, continued development pressures are likely to further aggravate the existing problems and lead to widespread impacts on water quality throughout the basin. Given this situation, plans for wastewater management improvements in the Loveland/Horners Run planning area must address critical needs in the several areas.

1. A comprehensive plan for correcting existing home sewage disposal system problems needs to be implemented to minimize the potential for public health and water quality impacts and nuisance conditions.

2. Decisions need to be made regarding the future value of the existing CCSD North Plants treatment facilities. Significant rehabilitation type improvements are necessary even if these systems are only required for the short-term.

3. Improvement plans for the Loveland/Horners Run planning area must provide for continued suburban density growth and development.

Evaluation of Wastewater Management Alternatives

Wastewater management improvements are needed within the Loveland/Horners Run planning area to address on-site problems in existing unsewered areas, to maintain existing reliable treatment capacity within sewered areas and to provide for effective wastewater management in areas that are likely to develop over the next 25 years.

Description of Alternatives

Alternatives for meeting these needs within the Loveland/Horners Run planning area are somewhat limited. Given the type of existing development that has occurred in the planning area, the potential for individual on-lot or cluster corrections to the large number of on-site problem areas is limited. In addition, such an approach would not provide for continued suburban density development within the planning area. Significant improvements would also be required to rehabilitate several of the North Plants systems for extended service. As a result, development of a new regional collection and treatment system to serve the Loveland/Horners Run planning area is judged to be the most effective means of addressing the area's current and future wastewater management needs.

Several options for implementing a new regional system in the Loveland/Horners Run FPA exist. Options considered in this analysis included:

Option LVHR-1: Construction of a new regional wastewater treatment plant near the confluence of the Horners Run and the Little Miami River, along with trunk and local sewers as required to serve the entire planning area.

Option LVHR-2: Construction of a new regional wastewater treatment plant near Miamiville, along with trunk and local sewer improvements as required to serve the entire planning area

Option LVHR-3: Construction of a new network of trunk and local sewers as required to convey flows from the entire planning area to a new pumping station near Miamiville. Flows collected at Miamiville would be pumped up to a new connection with the Sugarcamp Interceptor in the Lower East Fork collection system.

Option LVHR-4: Consideration has also been given to the possibility of directing flows from portions of the existing Lower East Fork collection system to the new regional plant as a means of increasing available capacity at the LEF WWTP.

In each of the options considered interim improvements to individual discharging on-site systems would be required to improve effluent quality during the period between implementation of the master plan and completion of the collection system proposed to serve the entire planning area.

Alternative Evaluation/Recommended Plan

The three alternatives described above each provide a means of achieving effective wastewater management throughout the Loveland/Horners Run FPA. However, each of the options has unique advantages and disadvantages as outlined below.

Option LVHR-1: Construction of a new treatment facility and regional collection system provide the most flexible and cost effective alternative for both addressing existing wastewater management problems in the FPA and providing for projected future growth. However, construction of a new treatment facility near the mouth of the Horners Run is likely to face strong opposition due to the potential for aesthetic impacts at the treatment plant site and impacts associated with the construction of new interceptors along the Horners Run.

Option LVHR-2: As under option LVHR-1, construction of a new treatment facility and regional collection system provide the most flexible and cost effective alternative for both addressing existing wastewater management problems in the FPA and providing for projected future growth. And, by moving the proposed treatment plant site closer to the existing community of Miamiville, it is expected that it may be possible to better address concerns related to the impact of the facility on the Little Miami Scenic River corridor. The Miamiville site also reduces the need for construction of new interceptors along stream corridors. Siting and permitting issues will still be a major issue under this option. However, it appears that the Miamiville site has features that would make obtaining approval of a site more likely.

Option LVHR-3: Under option LVHR-3, the need for a new treatment facility along the Little Miami River is eliminated. The treatment plant would be replace by a major pumping facility designed to convey all flows from the planning area to a new connection with the Sugarcamp

interceptor of the Lower East Fork Collection system. While this approach has the advantage of not requiring a new treatment plant on the Little Miami River, it requires the construction of a high head pumping station, significant force main, and improvements to the existing Lower East Fork collection system. Peak flows to the Lower East Fork WWTP would also be increased during wet weather events.

Option LVHR-4: Alternately, CCSD staff have discussed the potential for diverting flow from the upstream portions of the Lower East Fork Collection System (upstream of Cook Road and State Route 28 Lift Stations) to the new Northwest Regional WWTP. The goal of this approach would be to increase the effective capacity of the Lower East Fork plant for serving new growth in other parts of its service area. At present, 16,610 of the approved 17,500 SFE connections to the Lower East Fork WWTP are in use. Thus, on the basis of SFE connections, the plant is operating at 95 percent of its approved capacity, and the potential for serving new growth in the service area is limited.

While this alternative could be used to increase the number of SFE connections available at the Lower East Fork WWTP, the improvements required would be significant and costly. First, nearly 10,000 feet of new gravity sewer, much located along sensitive stream corridors, would be required to redirect flows from the two pumping stations to the proposed Ibold Road interceptor. Secondly, the increased flows would necessitate increases in the sizing of at least three proposed pumping stations along the Ibold Road line and the proposed Miamiville WWTP. Lastly, in order for this approach to provide short-term benefits at the Lower East Fork plant, construction of the proposed Ibold Road interceptor would have to be expedited despite the fact that it provides fewer benefits than either of the other major interceptor projects needed to serve the Loveland/Horners Run area.

More importantly, however, it appears that the limit on connections at the Lower East Fork WWTP may be more of an administrative limit than a real process or hydraulic limit. Though the Lower East Fork collection system and treatment plant are clearly in need of improvements to improve the system's ability to manage peak wet weather flows, the average influent flow and organic loading observed at the treatment plant are less than 65 percent of the design values for the process. In fact, if the quantity of extraneous flow reaching the plant can be controlled and hydraulic bottlenecks in the system resolved, it is projected that the current plant capacity of 7.0 mgd should be adequate to accommodate average flows out to the year 2020.

Typically, SFE connections are estimated to account for about 400 gallons of flow per day per connection. However, the current 16,610 SFE's tributary to the Lower East Fork WWTP generated only an average of 276 gallons per connection during 1994. As a result, the current SFE limit does not appear to accurately reflect the flow and loading conditions to the plant. The CCSD should review this matter with the OEPA to determine whether an adjustment in the plant SFE rating is warranted.

Based on consideration of the advantages and disadvantages associated with each of the alternatives considered, implementation of Option LVHR-2 is recommended as the best approach to meeting the wastewater management needs of the Loveland/Horners Run planning area. This approach provides for the development of an effective centralized wastewater management system to serve both the current developments in the area and likely future growth. At the same

time, the recommended plan includes consideration of factors that may impact the implementation of the improvement program. The recommended program will also address concerns related to on-site wastewater system discharges in the vicinity of the existing CCSD Miami-Goshen-Stonelick well field. The existing well field is located adjacent to Miamiville.

Development of the proposed collection and treatment system is proposed to be staged so as to spread out the cost of the capital improvements required. The initial stages of the project will involve the final planning, design and construction of the new Miamiville Wastewater Treatment Plant and the first phases of the Ward's Corner and Branch Hill collector and local sewers. These projects will provide for elimination of many of the on-site problems in the planning area and decommissioning of the Indian Lookout, Bramblewood, Ward's Corner, Hilltop Research and Kwik Center treatment plants within the next five years.

The second stage of the recommended improvement program will focus on the expansion of the Miamiville WWTP and the extension of the new sewer system to the additional portions of the planning area (Branch Hill Interceptor II, Ibold Road Interceptor I). Implementation of these projects will provide for decommissioning of the Arrowhead Park and Miami Trails treatment plants by the year 2005.

Lastly, a third stage of improvements is proposed to provide centralized service to the southern section of the planning area along Ibold Road. This final improvement effort will address on-site problems in the relatively low density developments in this area.

Since implementation of the proposed improvement program is to be staged over a period of 10-15 years, interim upgrades to existing, discharging on-site systems will also be required.

A list of the elements of the recommended wastewater management plan for the Loveland/Horners Run Facility Planning Area and their respective costs is presented in Table 3-18 at the end of this chapter. The location of the recommended improvements are shown in Exhibit 10. Brief descriptions of the recommended projects grouped by recommended time frame for implementation are given below.

DESCRIPTION OF RECOMMENDED IMPROVEMENTS
LOVELAND/HORNERS RUN FACILITY PLANNING AREA

(Improvement numbers refer to indices on Exhibit 10)

Completed by 1995

LVHR-1 **Arrowhead Park WWTP Rehabilitation.** Rehabilitation of treatment plant structures and equipment to provide reliable treatment through 2005.

LVHR-2 **Bramblewood WWTP Rehabilitation.** Rehabilitation of existing treatment plant facilities to maximize useful capacity and extend useful life of plant through the year 2000.

LVHR-3 **Indian Lookout WWTP Rehabilitation.** Rehabilitation of existing treatment plant facilities to extend reliable useful life through the year 2000.

LVHR-4 **Miami Trails Expansion IV.** Construction of additional facilities as required to meet discharge criteria and support increased development within tributary subdivisions.

Completed by 2000

LVHR-5 **Miamiville WWTP I.** Final planning, design and construction of Phase I of Miamiville WWTP (1.0 mgd). Treatment process will likely have to provide for advanced treatment of wastewater prior to discharge to Little Miami River. Siting improvements may also be required to satisfy Scenic River and local siting constraints.

LVHR-7 **Branch Hill Interceptor and Local Sewers.** Construction of new trunk sewer, local sewers, lift stations and force main as required to serve unsewered areas in Miamiville and along Branch Hill Road. Project will provide for decommissioning of Indian Lookout WWTP (4006), Ward's Corner WWTP (4034) and Hilltop Research WWTP (4045) as well as elimination of on-site problem areas along Branch Hill Road. Trunk sewer sized to support additional growth through build-out.

DESCRIPTION OF RECOMMENDED IMPROVEMENTS
LOVELAND/HORNERS RUN FACILITY PLANNING AREA

(Improvement numbers refer to indices on Exhibit 10)

Completed by 2000 (continued)

LVHR-9 **Ward's Corner Interceptor and Local Sewers.** Construction of new trunk sewer, local sewers, lift stations and force main as required to serve unsewered areas along Ward's Corner Road both east and west of I-275. Project will provide for decommissioning of Bramblewood WWTP (4007) and Kwik Center (4046) treatment facilities and serve on-site problem areas along Ward's Corner Road. Trunk sewers sized to support additional growth in tributary areas through build-out.

LVHR-1 **Interim Aerobic Upgrades.** Inspection, repair and upgrade of individual discharging on-site systems located in areas that will not be sewered by the year 2000. Improvements are proposed to provide for more reliable treatment prior to discharge during the period before centralized sewers become available.

Completed by 2005

LVHR-6 **Miamiville WWTP II.** Expansion of the Miamiville WWTP to provide rated capacity of up to 2.0 mgd.

LVHR-8 **Branch Hill Interceptor II.** Extension of new trunk sewer north of I-275 to pick up flows from Arrowhead Park and Miami Trails treatment plants, and to serve on-site problem areas adjacent to Branch Hill-Guinea Road. Project will require construction of three significant lift stations as well as force main and local sewer improvements. Trunk sewer sized to accommodate future growth in tributary area through build-out.

LVHR-10 **Ibold Road Interceptor and Local Sewers.** Construction of new trunk sewer, local sewer, lift stations and force main as required to serve unsewered areas along Ibold Road. Trunk sewer sized to accommodate future development in tributary area through build-out.

LVHR-14 **Syrian Temple Extension.** Construction of a lift station and force main to provide for elimination of existing semi-public wastewater treatment facility at Syrian Shrine Oasis (4002).

DESCRIPTION OF RECOMMENDED IMPROVEMENTS
LOVELAND/HORNERS RUN FACILITY PLANNING AREA

(Improvement numbers refer to indices on Exhibit 10)

Completed by 2000 (continued)

LVHR-16 **Loveland Sewer Extensions (East).** Construction of lift station, force main and local sewers as required to serve unsewered areas along Route 48 southeast of Loveland. Flow to be pumped to the O'Bannon Creek WWTP.

Completed by 2010

LVHR-11 **Ibold Road Interceptor and Local Sewers II.** Extension of new trunk and local sewers south to serve remaining unsewered area in southern portion of planning area. Trunk sewer sized for build-out flows from tributary areas.

LVHR-12 **Lake Remington WWTP Upgrade.** Upgrade of existing Lake Remington WWTP to meet discharge criteria and provide additional capacity for service of area along Little Miami River.

LVHR-13 **Bern Lake Extension.** Construction of new lift station, force main and sewer as required to serve unsewered areas along Little Miami River.

LVHR-15 **Loveland Extensions (West).** Construction of new local sewer to serve unsewered areas southwest of Loveland.